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(56) Documents Cited

**US 5492021 A US 5382120 A**

**WPI Accession No.84-268420/198443 & SU 1076808 A**

**(N CAUC-- ) 28.02.84 (see abstract) WPI Accession**

**NO.83-765271/198338 & CA 1152774 A (CANADA**

**MIN-- ) 30.08.83 (see abstract)**

(58) Field of Search

**UK CL (Edition ) G1M MCCA MCDX MDBX MHAC ,  
G1S**

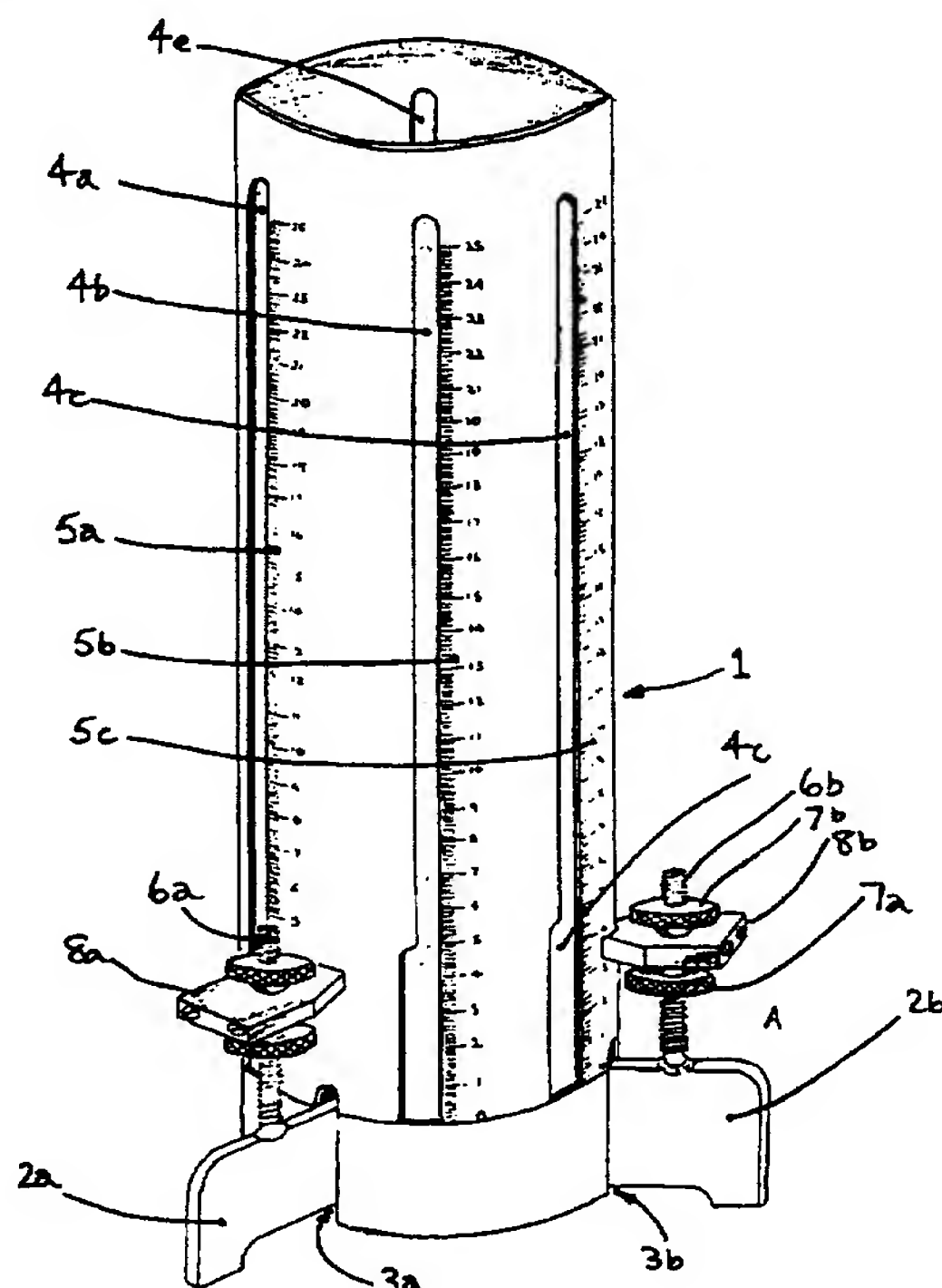
**INT CL<sup>6</sup> E02D 1/00 1/02 1/04 1/06 1/08 , G01B 3/00 ,  
G01N 1/04 1/08**

**On-line : WPI**

(54) Abstract Title

**Bound materials core measuring device**

(57) The present invention concerns a bound materials core measuring device which comprises: a free-standing, rigid, transparent or apertured tubular body 1 adapted to accommodate a core sample of road or pathway surfacing bound material and having a plurality of graduated scales 5a-f extending therealong at spaced intervals therearound so as to enable the sample to be viewed through the body and the depth of the relevant one or more layers of the core sample to be measured from a plurality of angles by reading from each of the plurality of graduated scales.



**FIGURE 1**

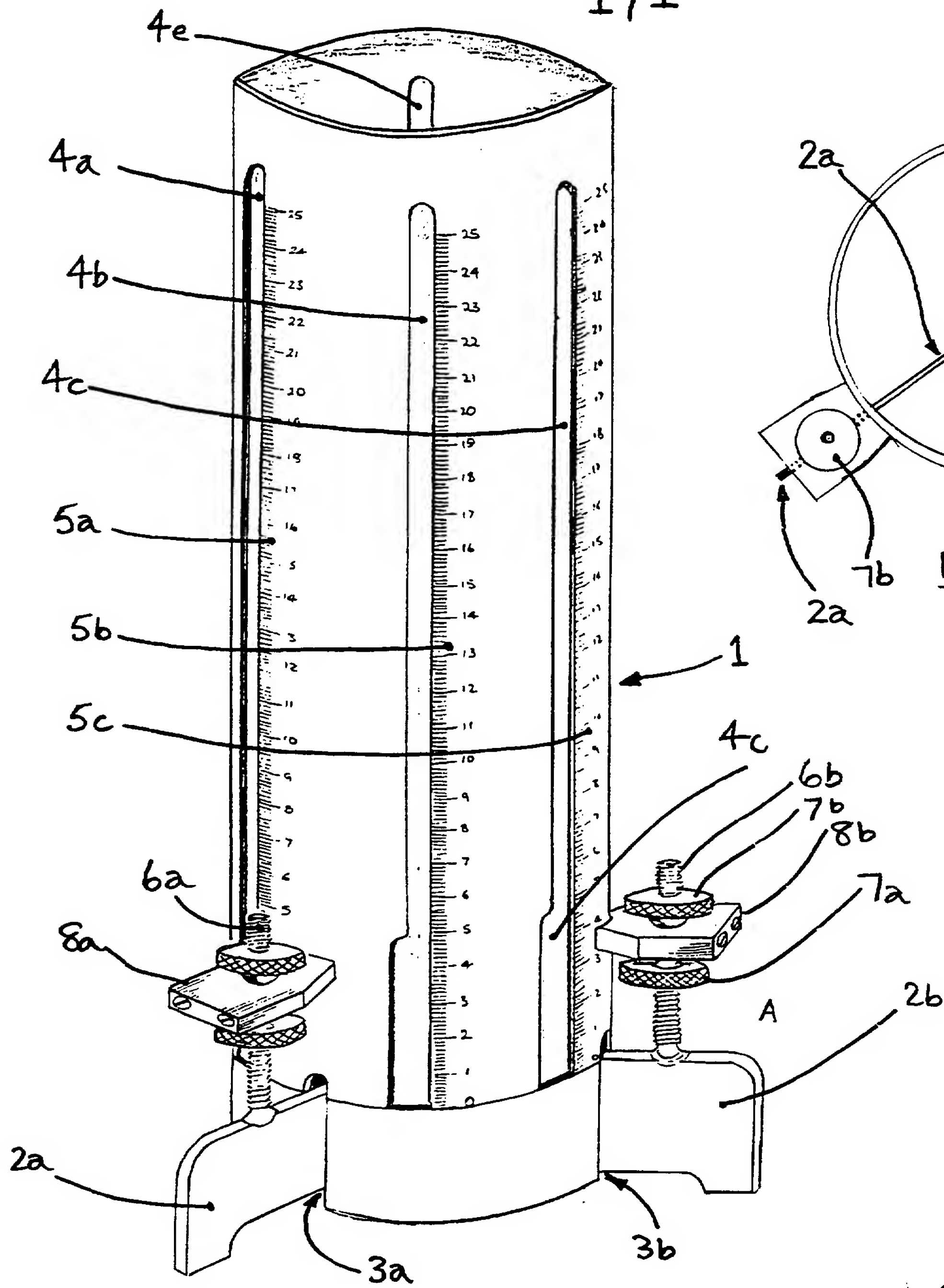


FIGURE 1

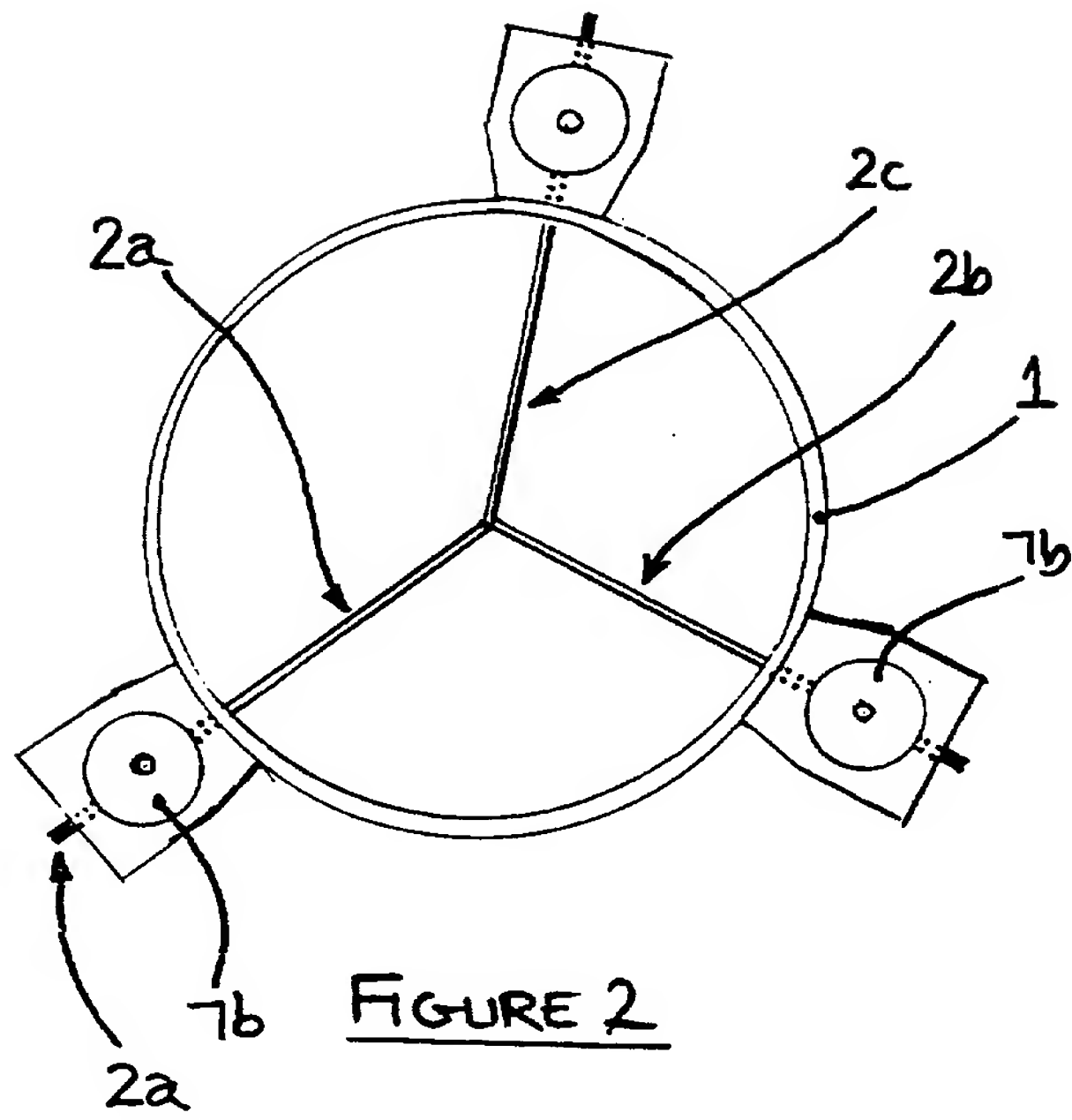
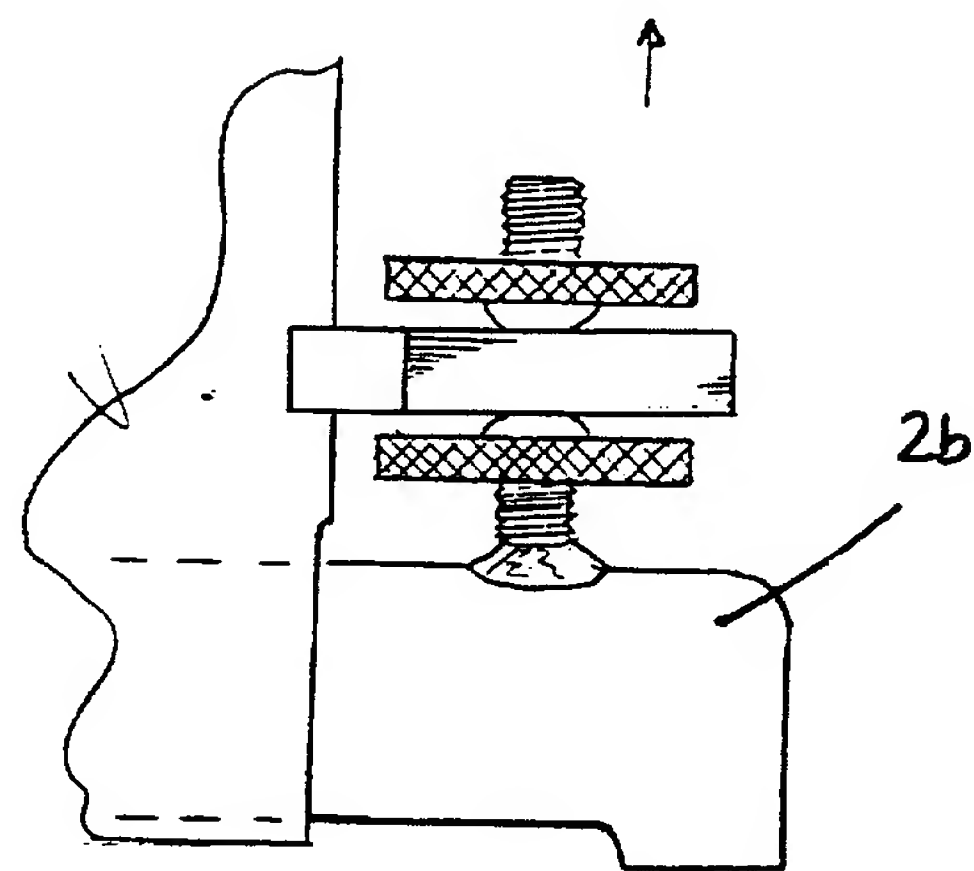


FIGURE 2



DETAIL AT "A" ↓

FIGURE 3

**BOUND MATERIALS CORE MEASURING DEVICE****Field of the Invention**

The present invention relates to a bound materials core measuring device  
5 suitable for measuring the thickness of layers of surfacing material of a surfaced road or  
footway. The bound material of the applied surfacing may be cement-bound or  
bitumen-bound e.g. asphalt - being a mixture of asphaltic bitumen and granite  
chippings, sand or powdered limestone - or may be any other of the known, or as yet  
unknown, road or pathway surfacing bound materials.

**10 Background to the Invention**

The quality and depth of road and footway surfacing plays an important role in  
safety for the road and pathway users. Partial subsidence or rucking of the surfacing  
material may trip a pedestrian on a footway or deflect the tyres of a road vehicle risking  
loss of control by the motorist.

15 Highways legislation covering the mandatory requirements for road and  
pavement quality and particularly depth of surfacing layers has tightened up  
considerably over recent years. Under the New Roads and Street Works Act, 1991 the  
allowed tolerance for thickness of upper surfacing layer or "wearing course" is to be  
within + 10mm to -5 mm of a specified thickness for a given material - most commonly  
20 40 mm. Very substantial penalties are exacted for failure to meet this requirement.

Through safety consciousness and the impact of the stringent legal obligations,  
those whose work entails excavating roads and pathways are obliged to take great care  
when reinstating those roads or pathways and are subject to official inspection of their  
reinstatement work. In the case, for example, of cable television engineers who  
25 routinely channel through hundreds of miles of roads and footways to provide cable  
access to millions of consumers there is a very major budgetary burden to ensure that

the roads and footways are properly reinstated and failure to meet the statutory requirement for surfacing layer thickness on inspection can greatly increase their operating costs. Accordingly, it is very important to them to have a demonstrably precise and reliable gauge for measuring the thickness of core samples taken for  
5 inspection.

Conventionally, the core samples for inspection are extracted from the site as vertical cylinders of the bound material generally between 100 mm and 150 mm in diameter and up to 300 mm in depth although generally the most important portion to be measured, the wearing course, constitutes only the first 40 mm or so. The core  
10 samples are sent to a government laboratory for measurement, taking days and weeks to process and removing any opportunity for witnessing or validation of the results.

It is a general objective of the present invention to provide a bound materials core measuring device which will enable precise and reliable measurement of the thickness of the layers of the bound material and which enables the measurements to  
15 be carried out swiftly and simply in a manner that could be executed on site rather than requiring removal to a distant laboratory.

#### Summary of the invention

In accordance with the present invention there is provided a bound materials core measuring device which comprises: a free-standing, rigid, transparent or apertured  
20 tubular body adapted to accommodate a core sample of road or pathway surfacing bound material and having a plurality of graduated scales extending therealong at spaced intervals therearound so as to enable the sample to be viewed through the body and the depth of the relevant one or more layers of the core sample to be measured from a plurality of angles by reading from each of the plurality of graduated scales.

25 For the substantially cylindrical core samples, providing maximal support to them for substantially their full length the tubular body is suitably cylindrical and, more

preferably, is only of the order of 5 to 10 mm greater in radius than the core sample to be measured. Most preferably the tubular body is formed of metal and provided with linear apertures extending for a major part of the length thereof and spaced at intervals there around, each aperture adjacent a respective graduated scale.

5            Preferably the lower end, in use, of the tubular body has one and preferably more fins extending there across to support any core sample held within the tubular body. The use of fin supports enable debris to drop away from beneath the core sample resting at the bottom of the tubular body to eliminate associated measurement errors.

10           In one preferred embodiment the fins serve also as support legs for the tubular body which extend from within the tubular body to the exterior thereof.

            Preferably the base line zero of the graduated scales is at the level on the tubular body at which a core sample comes to rest when placed in the tubular body.

            In such case and where the tubular body has fin legs these are suitably  
15    adjustable to ensure that the fin legs are level with the base line zero level before measuring commences.

            Where the tubular body is provided with reading apertures these are suitably narrow for the majority of their length and broadened for only a part of their length where the most important readings are to be taken. This will optimise the integrity of the  
20    body without adversely affecting the visibility of the important portion of the core sample.

            In accordance with a second aspect of the present invention there is provided a method of measuring the depth thickness of a layer of a bound material core sample from a surfaced road or footway, which method comprises the use of a bound material core measuring device as claimed in any preceding claim.

According to a further aspect of the present invention there is provided an apparatus substantially as hereinafter described with reference to the accompanying drawings.

In a yet further aspect of the present invention there is provided a bound materials core measuring device which comprises: a free-standing, rigid, transparent or apertured tubular body adapted to accommodate a core sample of road or pathway surfacing bound material and having a graduated scale extending therealong so as to enable the sample to be viewed through the body and the depth of the relevant one or more layers of the core sample to be measured by reading from the graduated scale wherein the tubular body is open-ended at both top and bottom and/or apertured along a substantial portion of its length.

#### Brief Description of the Drawings

A preferred embodiment of the present invention will now be more particularly described by way of example with reference to the accompanying drawings, wherein:

Figure 1 is a front perspective view of the preferred embodiment deployed for use in an upright stance;

Figure 2 is a plan view from above of the embodiment of Figure 1; and

Figure 3 is a detailed view of one of the support fin legs of the Figure 1 embodiment.

#### Description of the Preferred Embodiment

Referring to Figure 1 the bound materials core measuring device illustrated comprises a cylindrical tubular body 1 of stainless steel or other relatively robust material capable of withstanding the highly abrasive nature of bound material core samples.

The tubular body 1 is open-ended at both top and bottom and is supported from the ground or other level support surface by three fin legs 2a-c that extend through axial



slots 3a-c in the tubular body 1 and interjoin at the radial centre of the tubular body 1 (see Figure 2). These fin legs 2a-c function not only as support legs for the body 1 but also as the base of the body 1 with the upper edges of the fin legs 2a-c holding the core sample in place while allowing debris to fall away beneath the core sample to prevent such debris from skewing the measurement readings to be taken.

Although the metal tubular body 1 is opaque the layers of the core sample may be viewed through each of six longitudinal apertures 4a-f spaced at equal intervals around the tubular body 1. Each of these apertures, or viewing ports, 4a-f has a graduated scale, graduated in mm, 5a-f running alongside it from a zero base-line that corresponds in use to the top edges of the fin legs 2a-c on which the core sample rests. For the first fifty mm or so of its length, which corresponds to the wearing course of the core structure each aperture 4a-f is relatively small - suitably of the order of 6 mm. Thereafter for the remainder of the length of the aperture, which extends for approximately 300 mm in the illustrated example, the aperture is halved in breadth, since viewing is less crucial here allowing strength of the tubular body 1 to be optimised.

Suitably the fin legs 2a-c may be rigidly fixed to the tubular body 1. Alternatively, as illustrated, the fin legs 2a-c may be height adjustable within restricted limits. The fin legs 2a-c may each be adjusted upwardly or downwardly on a respective support bolt 6a-c by adjustment of nuts 7a,b securing each support bolt to a respective support leg 8a-c projecting perpendicularly from the tubular body 1.

Although the present invention has been described hereinabove with respect to one preferred embodiment numerous alternatives are conceivable within the scope of the invention. The tubular body may, for example, have a closed lower end but in such case the fins or a grid or grille or carefully engineered constriction of the side walls of the tube is suitably provided to hold each core sample at a fixed level in the tubular body while allowing debris to fall below.

The ability to read the thickness of the layers of the core sample at a plurality of radial angles is extremely valuable to enable a mean average to be taken to eliminate errors arising, for example, from the relatively coarse nature of the material.



## CLAIMS

1. A bound materials core measuring device which comprises: a free-standing, rigid, transparent or apertured tubular body adapted to accommodate a core sample of road or pathway surfacing bound material and having a plurality of graduated scales  
5 extending therealong at spaced intervals therearound so as to enable the sample to be viewed through the body and the depth of the relevant one or more layers of the core sample to be measured from a plurality of angles by reading from each of the plurality of graduated scales.
2. A bound materials core measuring device as claimed in claim 1 wherein the  
10 tubular body is cylindrical and of the order of 5 to 10 mm greater in radius than the core sample to be measured.
3. A bound materials core measuring device as claimed in claim 1 or claim 2 wherein the tubular body is formed of metal and provided with linear apertures extending for a major part of the length thereof and spaced at intervals there around,  
15 each aperture adjacent a respective graduated scale.
4. A bound materials core measuring device as claimed in claim 1, 2 or 3, wherein the lower end, in use, of the tubular body has one or more fins or a grid or grille extending there across to support any core sample held within the tubular body.
5. A bound materials core measuring device as claimed in claim 4, wherein the fins  
20 serve also as support legs for the tubular body which extend from within the tubular body to the exterior thereof.
6. A bound materials core measuring device wherein the base line zero of the graduated scales is at the level on the tubular body at which a core sample comes to rest when placed in the tubular body.
- 25 7. A bound materials core measuring device as claimed in any preceding claim wherein the tubular body has height adjustable legs.

8. A bound materials core measuring device as claimed in claim 5 and claim 7 wherein the legs are fin legs and these are adjustable to ensure that the fin legs are level with the base line zero level before measuring commences.
9. A bound materials core measuring device as claimed in claim 3 wherein the  
5 apertures are narrow for the majority of their length and broadened for only a part of their length where the most important readings are to be taken.
10. A method of measuring the depth thickness of a layer of a bound material core sample from a surfaced road or footway, which method comprises the use of a bound material core measuring device as claimed in any preceding claim.
- 10 11. An apparatus substantially as hereinbefore described with reference to the accompanying drawings.
12. A bound materials core measuring device which comprises: a free-standing, rigid, transparent or apertured tubular body adapted to accommodate a core sample of road or pathway surfacing bound material and having a graduated scale extending  
15 therealong so as to enable the sample to be viewed through the body and the depth of the relevant one or more layers of the core sample to be measured by reading from the graduated scale wherein the tubular body is open-ended at both top and bottom and/or apertured along a substantial portion of its length.

**Amendments to the claims have been filed as follows**

1. A bound materials core measuring device which comprises: a free-standing, rigid, transparent or apertured tubular body adapted to accommodate a core sample of road or pathway surfacing bound material and having a plurality of graduated scales  
5 extending therealong at spaced intervals therearound so as to enable the sample to be viewed through the body and the depth of the relevant one or more layers of the core sample to be measured from a plurality of angles by reading from each of the plurality of graduated scales.
2. A bound materials core measuring device as claimed in claim 1 wherein the  
10 tubular body is cylindrical and of the order of 5 to 10 mm greater in radius than the core sample to be measured.
3. A bound materials core measuring device as claimed in claim 1 or claim 2 wherein the tubular body is formed of metal and provided with linear apertures extending for a major part of the length thereof and spaced at intervals there around,  
15 each aperture adjacent a respective graduated scale.
4. A bound materials core measuring device as claimed in claim 1, 2 or 3, wherein the lower end, in use, of the tubular body has one or more fins or a grid or grille extending there across to support any core sample held within the tubular body.
5. A bound materials core measuring device as claimed in claim 4, wherein the fins  
20 serve also as support legs for the tubular body which extend from within the tubular body to the exterior thereof.
6. A bound materials core measuring device as claimed in any preceding claim wherein the base line zero of the graduated scales is at the level on the tubular body at which a core sample comes to rest when placed in the tubular body.
- 25 7. A bound materials core measuring device as claimed in any preceding claim wherein the tubular body has height adjustable legs.

8. A bound materials core measuring device as claimed in claim 5 and claim 7 wherein the legs are fin legs and these are adjustable to ensure that the fin legs are level with the base line zero level before measuring commences.
9. A bound materials core measuring device as claimed in claim 3 wherein the  
5 apertures are narrow for the majority of their length and broadened for only a part of their length where the most important readings are to be taken.
10. A method of measuring the depth thickness of a layer of a bound material core sample from a surfaced road or footway, which method comprises the use of a bound material core measuring device as claimed in any preceding claim.
- 10 11. An apparatus substantially as hereinbefore described with reference to the accompanying drawings.
12. A method of measuring the depth of the relevant one or more layers of a core sample of road or pathway surfacing bound material, which method comprises firstly obtaining the core sample and then placing it in the bound materials core measuring  
15 device of any preceding claim and measuring the depth of the relevant one or more layers by reading from each of the plurality of graduated scales and taking an average of the readings.



Application No: GB 9722995.9  
Claims searched: ALL

Examiner: Michael Walker  
Date of search: 22 December 1997

**Patents Act 1977**  
**Search Report under Section 17**

**Databases searched:**

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:

UK Cl (Ed.O): G1S (SAC); G1M (MCCA, MCDX, MDBX, MHAC)

Int Cl (Ed.6): G01B 3/00, 5/18; G01N 1/04, 1/08; E02D 1/00, 1/02, 1/04, 1/06, 1/08

Other: On-line : WPI

**Documents considered to be relevant:**

Category	Identity of document and relevant passage	Relevant to claims
Y	US 5492021 (BOURGEOIS) whole document	1-4,10,12
A	US 5382120 (PARSONS) see fig.1	1
X,Y	WPI Accession No.84-268420/198443 & SU 1076808 A (N CAUC--) 28.02.84 (see abstract)	X:12 Y:1,10
X,Y	WPI Accession No. 83-765271/198338 & CA 1152774 A (CANADA MIN--) 30.08.83 (see abstract)	X:12 Y:1,10

X Document indicating lack of novelty or inventive step  
Y Document indicating lack of inventive step if combined  
with one or more other documents of same category.  
& Member of the same patent family

A Document indicating technological background and/or state of the art.  
P Document published on or after the declared priority date but before  
the filing date of this invention.  
E Patent document published on or after, but with priority date earlier  
than, the filing date of this application.

**DERWENT-ACC-NO:** 1999-027303

**DERWENT-WEEK:** 199930

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**TITLE:** Core measuring device e.g. for thickness of road surfacing material layers has tubular body, which accommodates core sample, with scales at spaced intervals around it for measuring layers viewed through either apertures or transparent body

**INVENTOR:** MURTAGH B J

**PATENT-ASSIGNEE:** MURTAGH B J[MURTI]

**PRIORITY-DATA:** 1997GB-007684 (April 16, 1997)

**PATENT-FAMILY:**

<b>PUB-NO</b>	<b>PUB-DATE</b>	<b>LANGUAGE</b>
GB 2326722 A	December 30, 1998	EN
GB 2326722 B	July 14, 1999	EN

**APPLICATION-DATA:**



<b>PUB-NO</b>	<b>APPL- DESCRIPTOR</b>	<b>APPL-NO</b>	<b>APPL-DATE</b>
GB 2326722A	N/A	1997GB- 022995	November 3, 1997
GB 2326722B	N/A	1997GB- 022995	November 3, 1997

**INT-CL-CURRENT:**

<b>TYPE</b>	<b>IPC DATE</b>
CIPS	G01N1/28 20060101
CIPS	G01N33/42 20060101

**ABSTRACTED-PUB-NO:** GB 2326722 A**BASIC-ABSTRACT:**

The device has a free standing, rigid transparent or apertured (4a-f) tubular body (1) adapted to accommodate a core sample of surfacing bound material. The body has a number of graduated scales (a-f) at spaced intervals around and extending along it to enable the sample to be viewed through the body and the depth of the layers of the core sampled to be measured from a number of angles by reading from the scales.

USE - Measuring thickness of cement or bitumen bound surfacing material layers e.g. of pathway.

ADVANTAGE - Allows measurement to be executed on site rather than requiring removal to distant laboratory.

**CHOSEN-DRAWING:** Dwg.1/3

**TITLE-TERMS:** CORE MEASURE DEVICE THICK ROAD  
SURFACE MATERIAL LAYER TUBE  
BODY ACCOMMODATE SAMPLE SCALE  
SPACE INTERVAL VIEW THROUGH  
APERTURE TRANSPARENT

**DERWENT-CLASS:** Q42 S02 S03

**EPI-CODES:** S02-A01A; S02-A01C3; S03-E13A;

**SECONDARY-ACC-NO:**

**Non-CPI Secondary Accession** 1999-021069  
**Numbers:**